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Wood is Soft

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by

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All requirements for graduation with Honors in the
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The subject of my research project is exploring different wood bending techniques and using solid wood to make a piece of furniture that combines coat hangers and benches. I have had several experiences in utilizing technology for making the furniture pieces. In this project, I will be exploring how to do manual woodworking instead of working with a CNC machine. I have always admired skilled hand craftsmen, and I am very excited about this first opportunity to take advantage of this research to learn more about woodworking hand skills.

In this project, the techniques that I mainly used are steam bending, laminating and kerf cutting. The material I chose is white oak. Because of my investigation of the wood, I found that oak is an easy-to-steam-bended wood with high plasticity and at the same time it is firm under normal conditions. The color of white oak is also very gentle and beautiful, and it is an ideal material for making furniture. I started with collecting information about where people would use coat tree. I realized that they are often placed in the hallway of people's homes. When people enter and exit the home, they change their shoes, take off their hat or coat and hang them on a tree. I asked my friends what else is needed when entering and leaving the house? They all mentioned the need to be able to sit down and put on shoes, especially when they are wearing boots or some complicated high heels, because standing on one foot or squatting on the ground is too precarious. Thus, I decided to add one more function that has space for people to sit and be able to put on their shoes. After several sketches, I utilized AutoCAD to draft and calculate the amount of material that I might need. Then I imported my CAD file to Rhino to build the 3D model and checked how it would look like in overall shape. Next came the real woodworking part. I first trimmed my wood with the Table Saw and Planner to make sure that all the angles are 90 degrees, then cut the wood into small pieces ¼ inches thick and 55 inches long on the table saw. Then I took an hour to heat the steamer. After the temperature reached 220 degrees Fahrenheit, I put my wood chips in the steamer to steam for 30 minutes. In the waiting gap, I made four jigs with MDF board, and after I took the wood chips out of the steamer, I quickly put the wood chips on the jigs. I waited for two days until the wood chips were dry, I took them off the jigs. At this time, I could see that the wood chips began to have a curvature. I brushed the wood glue in between the pieces and put them back on the jigs for further shaping. This step is called laminating, and I waited ten days for the glue to dry completely. When the glue was dry, I removed the white oak that had been turned into a curved stick from the jigs, use the hand planer to scrape off the excess glue on the edges, and sanded the surface of the wood to make them smooth. This finished the coat rack part. The final step was kerf cutting. I calculated the depth and width of the trench and tried it on the excess material. After a successful experiment, I processed it on my final material. With the grooves, the wood could easily be folded up. I poured glue into the grooves and waited for drying, and then my seat was perfectly shaped.

I enjoyed this project. I know more about the properties of oak. This is the first time I have found that it will take so long to wait for the glue to dry out. I accidentally dropped a curved strip of wood to the ground, because the glue did not dry out and he cracked. I learned a variety of wood bending techniques by myself that can be applied to my future projects. The machine will no longer limit the scope of my future furniture production. There is still a high possibility of development in wood bending. I will continue to explore wood bending in my furniture design career.